Document ID:

10759

Incoming Magnet Repair Inspection/Survey

318898 / Rev. D

Job No: 373

MSD Project/Task No.: 30/30.9.1.1.2.1.1

M + S Project/Task No.: 30/30.9.1.1.2.1.1

Place This Side Down For Scanning!!!

Rework/Inspection Travelers

IQG333-0

Document ID:

10759

Job No.:

373

Project/Task No.

30/30.9.1.1.2.1.1

Series:

IQG

Serial No:

IQG333

Rework ID:

0

Specification No.:

318898

Revision:

D

IQG333-0

Fermi National Accelerator Laboratory
Batavia, IL 60510

Conventional Magnet/Device
Incoming Magnet Repair Inspection/Survey

Reference Drawing(s):

Project # Task #: *30/30.9.1.1.2.1.1*	**Job #:** *373*
Released by: *Jan Szal*	**Magnet/Device Series:** *IQG*
Date: *1/6/2009 12:40:03 PM*	**Scan Pages:** 18

Prepared by: B.Jensen

Title	Signature	Date
TD / Process Engineering	***Bob Jensen*** **Bob Jensen / Designee**	**12/5/07**
TD / E&F Assembly Supervisor	***Dan Smith*** **Dan Smith / Designee**	**12/5/07**
TD / E&F Production Physicist	***George Velev*** **Gueorgui Velev / Designee**	**12/5/07**

Revision Page

Revision	Step No.	Revision Description	TRR No.	Date
None	N/A	Initial Release	N/A	6/30/95
A		Transferred from Mac to PC format.	0945	2/3/00
	3.2	Inserted a Radiation and Lead Paint Survey.		
		Changed cover page approval list.		
B	Cover	Corrected spelling of Devise to Device.	1231	9/18/01
	4.2	Add a no 'Removal/Replacement.. check box.		
	4.5	Changed 'No Damage Noted' to 'If No Damage is noted, check no damage box. Added check box		
	4.6	Added a no water path check box, added if no water path, check box.		
	6.1	Add a no water path check box, added if no water path, check box.		
	6.2	Added a no water path check box, added if no water path, check box		
	8.1	Added check box, 'No MFA/CAC Action Required.'		
	10.1	Deleted step, 'O.K. to proceed' tag, not used		
C	2.2	Update DSR	1600	1/28/04
	7.2	Update DSR		
D	CvrPge	Updated to new format	1944	12/5/07
	RevPge	Updated to new format		
	2.2	Updated: Added check boxes.		
	3.0	New: Physically check all bolts holding magnet cores…..		
	5.1	Removed: Step was redundant (serial number on btm of page).		
	5.2	Added: Checkboxes to indicate Acceptable or Damaged		
	5.2	Changed: Sign-off to Inspector instead of Technician		
	5.3	Removed: Acquire previous data (data readily available OnBase)		
	7.1	Added: Upper and Lower Magnet flow check		
	7.2	Added: Upper and Lower Hydro check with Pass/Fail boxes.		
	8.2	Updated: Added check boxes		
	9.0	Updated to new format		

Ensure appropriate memos and specific instructions are placed with the traveler before issuing the sub traveler binder to production.

1.0 General Notes

1.1 White (Lint Free) Gloves (Fermi stock 2250-1800) or Surgical Latex Gloves (Fermi stock 2250-2494) shall be worn by all personnel when handling all product parts after the parts have been prepared/cleaned.

1.2 All steps that require a sign-off shall include the Technician/Inspectors first initial and full last name.

1.3 No erasures or white out will be permitted to any documentation. All incorrectly entered data shall be corrected by placing a single line through the error, initial and date the error before adding the correct data.

1.4 All Discrepancy Reports issued shall be recorded in the left margin next to the applicable step.

1.5 Personnel shall perform all tasks in accordance with current applicable ES&H guidelines and those specified within the step.

1.6 Cover the product/assembly with Green Herculite (Fermi stock 1740-0100) when not being serviced or assembled.

2.0 Parts Kit List

2.1 No Parts Kit List required.

2.2 Update DSR.

Update DSR Keywords	☑
Location	☑
Location Verified Date	☑
Status	☑
Make entry regarding work performed.	☑

Lead Person

1-6-09
Date

3.0 Magnet Safety Check prior to Truck Un-loading

3.1 Physically check all bolts holding magnet cores together are finger tight. If any bolts are loose, acquire proper dwg/torque values and Production tighten all bolts to the proper torque value.

Note: Prior to tightening the bolts, ensure that the keyway stock is installed and the cores/keyway stock are in the correct alignment position.

Record torque value _____ ft/lbs

☒ Welded Magnet, no action needed!

Inspector(s) _____ Date 1-9-2009

Technician(s) _____ Date _____

4.0 Hazard Survey

4.1 Perform a Radiation Survey and record results below. Describe Location and Level of any "HOT" spots.

.4 mR@ 1 Foot

Beam Tub Return end "HoT" Radioactive

Note(s):

If device is more than Radiation Class 1, reject acceptance of the device, unless there is written authorization from the Section Head.
If written authorization is given attach to the traveler.

Technician(s) [signature] Date 1-06-09

4.2 Send a sample of the paint to ES & H for lead testing, unless previously cleared by ES & H

☐ No Lead
ES & H Approved

☐ Lead Based Paint
Follow Precautions Below

N/A

Technician(s) Date

5.0 Visual Inspections

5.1 Attach the "REMOVAL/REPLACEMENT/REPAIR OF A.D. COMPONETS' sheet or equivalent documentation to this traveler.

☒ No 'Removal/Replacement/Repair of A.D. Components' and/or equivalent documentation received.

D. G... — Technician(s)

1-9-2007 — Date

5.2 Perform a visual inspection of the magnet/cores from the listed items below. The below list is not all inclusive. Note any damage, missing parts, or other abnormalities below, whether from the below list or not.

Note: Any damage, missing parts or other abnormalities noted should be reported to the Production Supervisor immediately, followed up by a Discrepancy Report.!

	Acceptable	Damaged	N/A
Magnet Cores	☒	☐	☐
Coil Leads/Manifold/Ceramics	☒	☐	☐
Coil Ends, Return	☒	☐	☐
Coil Ends, Lead	☒	☐	☐
Potting Cover, Lead End	☒	☐	☐
Potting Cover, Return End	☒	☐	☐
Beam Tube	☒	☐	☐
Beam Tube Flanges/Bellows	☒	☐	☒ NOT DAMAGED

Any recorded damage shall be specifically photographed and photos attached to this traveler.

U.S B.T FLANGE INCLUDES PART OF A UPSTREM B.T ASSY OR B.T. FROM ANOTHER MAGNET. NOT IN A CONFIGURATION THAT IS USABLE.

D. G... — Inspector(s)

1-9-2007 — Date

6.0 Electrical Inspection

6.1 Perform a Resistance (R), Inductance (Ls), and 'Q' electrical inspection and record the results below.

Equipment Serial No. 321005 84618

	Resistance	Ls @1KHz	Q@1KHZ	Ls @100Hz	Q @ 100Hz
Upper Half					
Lower Half					
Total Magnet	4.45 D.G 6.23mA	1.04mH	3.5	1.31mH	5.8

D. Gallo
Inspector

1-9-2009
Date

6.2 Hipot the Magnet.

Equipment Serial No. AR0504

500 Volts with < 5µA	Total Magnet	Upper Half	Lower Half
Coil to Core	.7µA		
Coil to Beam Tube	.3µA		
Core to Beam Tube	.3µA		

D. Gallo
Inspector

1-9-2009
Date

Pg 2030

6.3 Perform Ring Test at 100 Volts. Attach the Ring Test results to the back of this traveler.

D. Gallo
Inspector

1-9-2009
Date

7.0 Flow Test and Hydro

7.1 Perform a flow test at a ΔP of 60 psi and 100 psi as per the Mechanical (flow) Inspection (ES-318968)

☐ No Water Cooling Passages.

	Upper Magnet	Lower Magnet	Full Magnet
ΔP of 60 psi	X gpm	X gpm	6.3 gpm
ΔP of 100 psi	X gpm	X gpm	~~7.3~~ 8.2 ~~D.6~~ gpm

Note(s): Include a diagram of the water input and output test locations, and what part of the magnet is being tested.

D. GAU
Inspector

1-21-09
Date

7.2 Perform a hydro static check of the manifold/coil system at 500 psi for 30 minutes.

☐ No Water Cooling Passages.

	Upper Magnet		Lower Magnet		Full Magnet	
	Pass	Fail	Pass	Fail	Pass	Fail
500 psi/30 mins	X		X		✓	

D. GAU
Inspector

1-21-2009
Date

8.0 Beam Tube Vacuum Inspection

DR# 4017

8.1 Perform a vacuum leak check on the Beam Tube.

Check box if no Beam Tube is installed in the Magnet. ☐

SEE NOTE AT STEP # 5.2 CAN'T LEAK TEST AS CONFIGURED

PART NO.		SCALE UNITS BEFORE HELIUM PROBE	SCALE UNITS WHILE ENCLOSURE FLOODING	DETERMINATION OF MINIMUM DETECTABLE LEAK				
DATE TIME	OPERATOR'S LAST NAME			MDS ÷ ((Response - Bckgnd) ÷ Leak Value) = MDL				

Inspector: D. Ole — Date: 1-9-2009

8.2 Update the DSR.

Update DSR Keywords ☑

Location ☑

Location Verified Date ☑

Status ☑

Make entry regarding work performed. ☑

Lead Person: [signature] — Date: 1-26-09

8.3 Photograpgh the magnet, and store in OnBase.

Inspector: D. Ole — Date: 1-21-2009

9.0 Production Complete

9.1 Process Engineering verify that the Traveler is accurate and complete. This shall include a review of all steps to ensure that all operations have been completed and signed off. Ensure that all Discrepancy Reports and dispositions have been reviewed by the Responsible Authority for conformance before being approved.

Comments:

IQG PRINT # ME351445

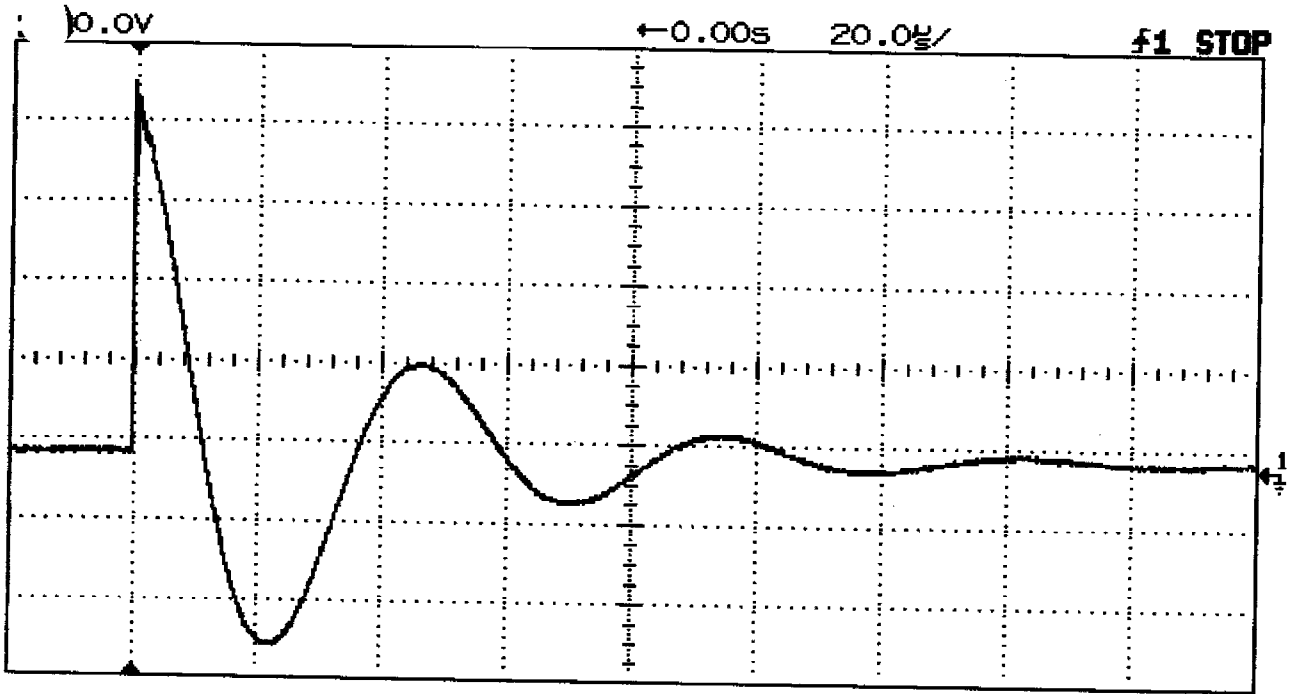
DRs: 4617, 4619

Process Engineering/Designee

1-26-09

Date

14:23:36 Fri Jan 9, 2009



	State	Volts/Div	Position	Cplg	BW Lim	Inv	Probe
Chan 1	On	20.00 V	-25.00 V	DC	Off	Off	10:1
Chan 2	Off	100.0mV	0.000 V	DC	Off	Off	1:1

	Mode	Main Time/Div	Main Delay	Time Ref	Delayed Time/Div	Delayed Delay
Horizontal	Normal	20.00us/	0.000 s	Left	--------	-----

Trigger Mode	Source	Level	Holdoff	Slope	Couplg	Reject	NoiseRej
AutoLvl	Ch 1	1.875 V	40.20us	Pos	DC	HF	On

Display Mode: Normal

Traveler	318898 RD
Step #	6.3
Magnet Serial Number	IGG 333-0
Technician	D. Gal
Page Count	1 of 1

Traveler Title:	Specification No:	Revision:	DR No:
Incoming Magnet Repair Inspection/Survey	318898	D	4617

Step No:	Drawing No:	Routing Form No:	Serial No:	Rework ID:
8.1	ME-351445		IQG333	0

Discrepancy Description:

Traveler instructs to, Perform a vacuum leak check on the bream tube.
Inspection was unable to leak check the beam tube, the upstream beam tube flange has been welded to another beam tube that was upstream of the IQG beam tube, when the magnet was removed from the beam enclosure it was rough sawed off leaving part of the up stream beam tube assembly on the end of IQG beam tube.
See the images in ON-Base.

Originator: Dennis Gaw

Date: 1/12/2009 8:06:49 AM

Cause of Nonconformance:

Beam tube configuration needed to work in the beam enclosure is not a conventional configuration for this type of magnet.

Responsible Authority: Dennis Gaw

Date: 1/12/2009 8:06:49 AM

Disposition:

This magnet is going to be changed to a IQB type magnet. During this operation the beam tube becomes just a liner for a new beam tube and the old flanges are removed.
Disposition verify notes: It is a fact that the magnet upgrade or change from a IQG quad to a IQB quad will change the configuration of the beam tube , Specification # 5520-TR-333127 has the necessary steps to provide for this beam tube change.

Responsible Authority: Dan Smith

Date: 2/16/2009

Corrective Action to Prevent Recurrence:

none at this time
Disposition verify notes: None, this beam tube was configured for use as it was needed.
I am checking will the configuration be affected as yes, the beam tube configuration will change, if the person closing out this DR needs to change the answer to no then he should change it as he sees fit.
Closeout notes: (Changed Configuration affected from Yes to No. Magnet will be converted and only the BT is affected, but will be changed to magnet style. Bob Jensen 2/23/09)

Responsible Authority: Dan Smith

Date: 2/16/2009

Corrective Action/Disposition Verified By: Dennis Gaw

Date: 2/17/2009 6:21:32 AM

Will Configuration be affected?: ☐ YES ☑ NO

Identified problem area:

☐ Material ☐ Manpower ☑ Method ☐ Machine ☐ Measurement

Reviewed By: Bob Jensen

Date: 2/23/2009

Traveler Title:	Specification No:	Revision:	DR No:
Incoming Magnet Repair Inspection/Survey	318898	D	4619

Step No:	Drawing No:	Routing Form No:	Serial No:	Rework ID:
5.2	ME-351445		IQG333	0

Discrepancy Description:

Perform a visual inspection of the magnet/cores from the listed items below. The below list is not all inclusive. Note any damage, missing parts, or other abnormalities below, whether from the below list or not.
Note:Any damage, missing parts or other abnormalities noted should be reported to the Production Supervisor immediately, followed up by a Discrepancy Report.!
Actual Visual inspection discovered that the water manifold has been damaged.
See the image associated with this DR in On-Base.

Originator: Dennis Gaw

Date: 1/12/2009 11:22:51 AM

Cause of Nonconformance:

Not known received from AD as is.

Responsible Authority: Dennis Gaw

Date: 1/12/2009 11:22:51 AM

Disposition:

The manifold will be repaired during the rework of this magnet from an IQG to a IQB.
Disposition verify notes: A copy of this DR will be attached to the magnet as a reminder that the water manifold needs to be repaired during the change from a IQG Quad to a IQB quad. Specification # 5520-TR-333127 also indicates that the water manifolding including the parts that are damaged would be removed and replaced.

Responsible Authority: Dan Smith

Date: 2/16/2009

Corrective Action to Prevent Recurrence:

NONE AT THIS TIME
Disposition verify notes: None, TD cannot control the removal or shipping process of magnets from other divisions. I would mark the will configuration be affected as yes this magnet is going to be changed from a IQG quad to a IQB quad, if the person that will close out this DR needs to change this then he should change the configuration answer as he sees fit.
Closeout notes: (Changed Configuration affected from Yes to No. Magnet will be converted and will be changed to magnet style. Bob Jensen 2/23/09)

Responsible Authority: Dan Smith

Date: 2/16/2009

Corrective Action/Disposition Verified By: Dennis Gaw

Date: 2/17/2009 6:13:31 AM

Will Configuration be affected?: ☐ YES ☑ NO

Identified problem area:

☐ Material ☐ Manpower ☑ Method ☐ Machine ☐ Measurement

Reviewed By: Bob Jensen

Date: 2/23/2009

	BQA	BQB	IQA	IQB	IQE	IQF	IQG	IQH	IQJ
Drawing Number	ME-351431	331912 or 351415	ME-351407	ME-331912	ME-351406	ME-351405	ME-351445	ME-351456	ME-388152
Electrical Limits Reference Drawing For Testing ES-351446	Resistance Coil .70 to .80 mOhms Magnet 2.85 to 3.15 mOhms Ls @ 1 KHz .60 to .67 mH Q 2.8 to 3.5	Resistance Coil 1.0 to 1.1 mOhms Magnet 4.25 to 4.75 mOhms Ls @ 1 KHz .97 to 1.07 mH Q 3.0 to 3.6	Resistance Coil .70 to .80 mOhms Magnet 2.85 to 3.15 mOhms Ls @ 1 KHz .60 to .67 mH Q 2.8 to 3.5	Resistance Coil 1.0 to 1.1 mOhms Magnet 4.25 to 4.75 mOhms Ls @ 1 KHz .97 to 1.07 mH Q 3.0 to 3.6	Resistance Coil 1.0 to 1.1 mOhms Magnet 4.25 to 4.75 mOhms Ls @ 1 KHz .97 to 1.07 mH Q 3.0 to 3.6	Resistance Coil 1.0 to 1.1 mOhms Magnet 4.25 to 4.75 mOhms Ls @ 1 KHz .97 to 1.07 mH Q 3.0 to 3.6	Resistance Coil 1.0 to 1.1 mOhms Magnet 4.25 to 4.75 mOhms Ls @ 1 KHz .97 to 1.07 mH Q 3.0 to 3.6	Resistance Coil 1.0 to 1.1 mOhms Magnet 4.25 to 4.75 mOhms Ls @ 1 KHz .97 to 1.07 mH Q 3.0 to 3.6	Resistance Coil .70 to .80 mOhms Magnet 2.85 to 3.15 mOhms Ls @ 1 KHz .60 to .67 mH Q 2.8 to 3.5
Continuity Check between Bean Tube and the Core 10 Volts Max.	Record for Reference Only	Record for Reference Only	Record for Reference Only	Record for Reference Only	Record for Reference Only	Record for Reference Only	Record for Reference Only	Record for Reference Only	Record for Reference Only
Hipot Coils to Core Coils to Beam Tube	< 5 µA @ 1500 Volts	< 5 µA @ 1500 Volts	< 5 µA @ 1500 Volts	< 5 µA @ 1500 Volts	< 5 µA @ 1500 Volts	< 5 µA @ 1500 Volts	< 5 µA @ 1500 Volts	< 5 µA @ 1500 Volts	< 5 µA @ 1500 Volts
Flow Limit 60 PSI	Coil 1.5 GPM Magnet 6.0 GPM	Coil 1.4 GPM Magnet 5.4 GPM	Coil 1.5 GPM Magnet 6.0 GPM	Coil 1.4 GPM Magnet 5.4 GPM	Coil 1.4 GPM Magnet 5.4 GPM	Coil 1.4 GPM Magnet 5.4 GPM	Coil 1.4 GPM Magnet 5.4 GPM	Coil 1.4 GPM Magnet 5.4 GPM	Half Magnet 1.1 GPM Magnet 2.1 GPM
Flow Limit 100 PSI	Coil 2.2 GPM Magnet 8.0 GPM	Coil 1.8 GPM Magnet 7.0 GPM	Coil 2.2 GPM Magnet 8.0 GPM	Coil 1.8 GPM Magnet 7.0 GPM	Coil 1.8 GPM Magnet 7.0 GPM	Coil 1.8 GPM Magnet 7.0 GPM	Coil 1.8 GPM Magnet 7.0 GPM	Coil 1.8 GPM Magnet 7.0 GPM	Half Magnet 1.4 GPM Magnet 2.8 GPM
Hydro Static Check	500 PSI for 30 Min.	500 PSI for 30 Min.	500 PSI for 30 Min.	500 PSI for 30 Min.	500 PSI for 30 Min.	500 PSI for 30 Min.	500 PSI for 30 Min.	500 PSI for 30 Min.	500 PSI for 30 Min.